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## CYSTIC GROWTH WITHIN THE INTERNAL CONDYLE OF THE FEMUR.

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Dr. M.<sup>1</sup> was born in the fall of 1861, and at the time of coming under our professional care, in November, 1892, was, therefore, in his thirty-second year. With the exception of a few of the simple diseases of childhood, he had always been very healthy, and had led a very active life. In the summer of 1879 he first noticed slight inability to completely flex the left knee; but during ordinary progression, or other movements of the joint, he experienced no inconvenience at that time. He also discovered the presence of a tender spot immediately above the extremity of the internal condyle. Pressure in this region caused some pain, but nothing of consequence. During the four years previous he had been much devoted to gymnastic exercises, and he naturally attributed the pain to the result of some injury received in vaulting over the parallel bars; he therefore discontinued this form of exercise; but, in spite of this, he noticed that the trouble gradually, though very slowly, increased. In the spring of 1880 he made a change in his habits and commenced to read medicine, and, as he was now leading a very sedentary life, he experienced very little inconvenience from the affected part.

While at college, December, 1881, he engaged in a friendly wrestle with a classmate, in the course of which he fell and forcibly bent the left knee under his body. The pain he experienced from this injury

<sup>1</sup> The history of this very interesting case was taken from a statement prepared by the patient, Dr. C. H. Mastin, Jr., of Mobile, Ala.



he describes as very intense ; indeed, for some moments immediately succeeding he was quite unable to extend the leg or, in fact, to move it at all. As the result of this accident, he was confined to his bed for two days. There was no swelling, heat, or redness ; there was simply a marked increase of pain at the site of the former tenderness ; this, however, gradually subsided, so that by the end of the week the limb had regained its usual condition. After this there was no further change for the worse until after he was graduated and had returned to his home in a Southern State.

The confinements of a student's life being over, he resumed the more active habits in pursuing the practice of medicine. He gained flesh, and soon weighed 198 pounds. The joint now only gave him trouble when it was forcibly flexed ; at such times the pain would compel him to relax the muscles and extend the limb. Complete extension was not in the least painful to him. Nothing noteworthy then occurred until the spring of 1887, when he experienced pain and tenderness also at the left sacro-iliac junction. This steadily increased in severity, and in three months the sciatic nerve at the notch became painful and the pain extended down along the course of the nerve. Tender spots existed, one at the external popliteal, another where the anterior tibial passes forward between the two bones of the leg ; there was also one on the dorsum of the foot.

At this time it was also noticed that extension of the left knee-joint produced a marked increase of pain in all of these points just named. Flexion of the joint caused intense agony at the old spot above the internal condyle. To increase his suffering the anterior crural nerve now became neuralgic, and the long saphena branch was painful throughout its entire length. The pain in all of these nerves was now constant, although at times worse than others. The most comfortable position in which he could place the limb was with the knee partly flexed ; this compelled him to walk on his toes with the heel elevated, and to attain this he had an extra heel placed upon the left shoe. His health now became impaired from the constant pain and want of exercise. His bodily weight fell to 168 pounds ; he became jaundiced and very nervous, and he suffered with repeated attacks of bilious colic, particularly at night. The muscles of the affected limb lost their tone, and the tissues wasted so that the limb was decidedly smaller than the right one. Sleep at night, except for a few hours, was impossible, and life now became a burden.



This state of affairs, in spite of treatment of various kinds, lasted for about eight months, after which the pain in the nerves became less severe and the general health began to improve. There was no change for the better, however, in the supra-condyloid spot or in the function of the knee-joint; if anything, the knee was stiffer and more bent. The pain in the spot now increased; exacerbations of pain were frequent and were often associated with twitching of the internal hamstring muscles. During these exacerbations there was a sharp, cutting pain at the cartilaginous tip of his left seventh rib, and by making pressure upon this point he declared that a marked increase in pain above the femoral condyle was produced. He described the sensation as being like a telegraphic communication between the two spots. This peculiar phenomenon, however, was not always present, and at times would be absent for weeks at a time.

As regards treatment, many and diverse remedies were employed. Electricity, by both the galvanic and faradic currents, was faithfully tried. Blisters were repeatedly applied over the condyle. On one or two occasions he froze the surface with ether spray. Cocaine injections down to the bone were made. Various ointments were employed, pressure was applied; but all to no purpose. Wrapping the knee in a towel soaked with cold water seemed to afford more relief than anything else. He also observed that during cold, wet weather he had always suffered less than in summer or during a dry spell in winter. For internal treatment he took many boxes of anti-neuralgic pills, but avoided the use of narcotics, fearing that the habit of using them might grow upon him. Iodide of potash was pushed to iodism without any evident result.

In the spring of 1888 he determined to seek surgical relief from his sufferings. He came to Philadelphia and placed himself under the charge of the late Professor D. Hayes Agnew, who regarded the case to be one of neuroma upon the internal branch of the saphena nerve. Dr. Agnew accordingly cut down upon the nerve, but found nothing abnormal. However, he excised two and one-half inches of the cutaneous branch under the impression that this was diseased and had probably caused the pain. Soon after the operation it was discovered that it had been a complete failure, as far as any relief from suffering was concerned. Apparently thinking that the moral effect of the operation might be sufficient to effect a cure, the patient was advised to return to his home for a while. He did so with shattered hopes,

and with the conviction that he was looked upon as a subject of hysteria by his medical advisers and friends.

Four years more of annoyance and suffering followed, during which time he was almost a cripple. He finally determined to return to Philadelphia, with his mind made up to have an operation done of a more radical nature than before, even if it involved amputation of the limb.

At my advice, he entered the Orthopædic Hospital in this city. The following notes of his condition were made by the surgeons and neurologists of the hospital: "There is a slight numbness of skin over the painful spot above the internal condyle of the left femur, but no general or local anæsthesia. The spot may be covered with the ends of two fingers, but the patient carefully guards it from being rudely touched or handled. There is motion in the knee-joint, which is kept in a partly flexed condition; either extreme flexion or extension causes pain. He can strike the heel upon the ground without pain, and insists that there is nothing the matter with the articulation. Measurements were made as follows:

	Right.	Left.
Around partly flexed knee . . . .	14 $\frac{7}{8}$ inches,	14 $\frac{3}{4}$ inches.
Six inches above the internal condyle . .	16 $\frac{1}{4}$ "	15 $\frac{1}{4}$ "
Thigh, near crease of buttock . . . .	21 "	20 $\frac{1}{2}$ "
Around the largest part of the calf . .	14 $\frac{1}{2}$ "	13 "

"Pain extends up to the left eighth rib, follows distribution of internal saphenous nerve, and also the trunk of the nerve up to sacro-sciatic notch; the obturator nerve also seems involved. The extreme pain is limited to the centre of the cicatrix remaining after former operation. Faradization elicited ready response, and muscular degeneration was not detected. Sight and hearing good. Urine high-colored, rich in uric acid and in oxalates; no albumin or sugar was found after careful examination."

The opinions of the case expressed by the physicians present were varied; but the general belief was that the disease was a neurosis with a gouty basis, as suggested by the father of the patient. It was determined that the proper course to follow was to make an exploratory incision to examine the condyle, and, failing to find anything there, to take out a long section of the internal saphenous nerve, high up, and to completely remove the old cicatrix, with any nerve branches that might be found there.

The operation was accordingly performed on Saturday, October 29,



1892. There were present Dr. S. Weir Mitchell, Drs. Thomas S. K. Morton and Pierce, and the resident physician who administered the anæsthetic. There was much struggling during the etherization; but even after he was fully under the influence, so that there was no longer any conjunctival reflex, a slight touch upon the seat of pain over the condyle at once caused marked reflex contraction of the muscles of the limb, which was repeatedly drawn up after all the rest of the body was insensitive.

COMMENT BY DR. HUNT ON THE ABOVE CASE.

Dr. Morton made at once a five-inch-long incision, exactly through the old scar and right down to the bone. On examining with the finger he came upon a rough plaque of bone, evidently the result of a periostitis. An elevator was easily got under this, and, with a chisel, the plaque was broken and lifted off. It formed the covering of a cyst having a thin wall of a bluish lead color. The cyst, which burst in the effort to remove it, contained a watery colloid fluid, and extended obliquely into the condyle for more than an inch. It was removed with all its attachments; the cavity, at least an inch wide, was curetted and finally cleaned out by the application of the crown of a trephine, and then thoroughly syringed with a weak bichloride solution. There was no hemorrhage.

The cavity was filled with iodoform gauze, and the patient was put to bed with the limb in a semiflexed position. This operation in all respects was a thorough success. The relief was almost immediate. The patient was up and walking about by the 4th of November, although strongly advised not to be too free in his movements. There was an entire change for the better in disposition. He is cheerful and has no fear of hurting the limb. Sleeps soundly and in any position, and considers himself as practically a well man. There is still some limp in gait, but this is due to the long contraction, which is relaxing rapidly. He was discharged after being twenty-one days in hospital. He walked up the steps of the railroad station without difficulty or pain.

From the moment Dr. Morton exposed the cyst wall I believed he uncovered an echinococcus cyst. My belief is further confirmed by what I have since read of such cases. One thing, and I admit an important one, is wanting—that is the

finding of the hooklets of the small entozoon. Dr. Burr, the pathologist of the Orthopædic Hospital, searched carefully for them, but they were not found. It takes a power of over 500 diameters to expose them, for they are only 0.03 of a millimetre in size, the whole worm measuring but 5 mm. or about one-fifth of an inch in length. Dr. Burr used an oil-immersion objective of over 900 diameters. I was sure I found a hooklet with my little Nachet of 625 diameters; it corresponded closely with the drawings, but Dr. Burr was not satisfied with the identity, and the specimen was rejected.

I find that the hooklets are easily lost by the bursting of the cyst, and at certain stages they drop from their attachments. Also, when we consider that there are but six of them in a unilocular cyst we can understand how easily they may be lost. We are, therefore, forced back on the clinical history, and this so agrees with other reported cases that I have no doubt about it.

First, I found that the patient had been excessively fond of dogs; they used to be his companions day and night; remember that when the pain attacked him it came on suddenly and without any accident or other thing to which to attribute it.

This is also the history of the cases recorded. Echinococcus in bone is so rare (according to Neisser, there are 28 bone cases to 985 other organs) that the opportunities of observing are very limited. I was fortunate to find in the Lewis Library of the College of Physicians an inaugural dissertation published in Berlin in 1889, by Freidrich Poppe, of Schlieben, entitled "Über den Echinococcus der Knochen." This, I think, is the only monograph on the subject; at least, it was all I could find. The author tabulates 60 cases, evidently with great research. Hahn counts up 36 cases, in 1883; and Thomas, of the Adelaide Hospital, South Australia, in an exceedingly interesting volume on *Hydatid Disease* (1884), simply catalogues 31 cases in bones, without giving the histories of any of them. When I read of a case in Poppe's list reported in 1819 in the *New England Medical Journal*, I thought I was going to turn up an American with this rare affection, but I found it was a case in Guy's Hospital that



was reported by a Dr. Webster, who was probably a student in London at the time.

The 60 cases of Poppe involved the following bones: 3 os frontis; 1 sphenoid; 8 vertebra; 3 innominate and sacrum; 1 ilium, pubis, and ischium; 4 ilia; 1 pubis; 2 ilia and femur; 1 scapula; 1 rib, fifth right; 1 sternum; 13 humeri; 1 humerus and femur; 1 index phalanx; 7 os femoris; 1 femur and tibia; 11 fibula. 20 of these are known to have died, 16 of them under treatment; 4 had no operative treatment; a case of Baudelocque's died of variola. It is not known what became of 15; it is to be presumed that most, if not all, of them died, as they appear to have been unamenable to treatment; they are catalogued as "nicht bekannt."

This shows the extreme fatality of this little entozoon, as fatal when it attacks the bones as when it invades other organs. There were 15 recoveries by operation—5 by incision; 1 trephine; 5 resections; 2 exarticulations; 2 amputations. Result not reported in 2 exarticulations. In 2, autopsies revealed the disease, 1 in scapula and 1 in humerus. Diagnosis is only made by exploration, mostly by incision. I did not come across one case that was rightly diagnosed before some kind of operation.

I verified the reports of Poppe in the journals at the College of Physicians, as far as regards the femur. Hahn's case, which was cured by amputation, occurred in a woman who had the disease in the internal condyle and head of tibia and was very like our case. There was intense pain in the part, for which she was admitted to a hospital twice; but finally returned the third time for amputation, so great was her suffering. By this time there were bulgings both below and above the knee; these required incisions, which revealed the cause of the disease, which had progressed so far as to remove all thoughts of saving the limb. The other cases had about the same general history.

These cases have received much attention from the explanation they are thought to give of so-called spontaneous fracture. The cyst in its growth thins out the bone, which disappears probably by absorption, and its weakened walls give way under the slightest provocation. These fractures, moreover, are char-

acterized by their obstinacy as to uniting, and if the disease which causes them is not recognized and removed, there is small chance for the limbs. Several most interesting accounts are given in the reports I read, but it would make this paper too long to give them here.

In the case of Dr. Mastin it was easy to see and to appreciate these conditions, and how readily the condyle could have been snapped off had the disease progressed much further. There was the thinning out of the bone, the disappearance of the cancellated structure very nearly as far as the joint cavity, the connective-tissue bindings of the cyst wall, and no microscopic evidence whatever of malignant or other disease. Therefore, if not echinococcus cyst, what was it? All we want are the hooklets, and, not finding them, we must rely upon the clinical history. From the table I have given you, I think the dog has his full revenge for anything that has been done to him in physiological research, and at the same time I think that it is a shame that it should be so.

It is curious that the antipodes, Iceland and Australia (see Thomas) should be the favorite seats of this disease; but at the same time they are also favorite seats for dogs. There is one dog to every three to five inhabitants in Iceland, and in one district every third man is said to have hydatids. Reliable records are not given as to Australia, but there are an immense number of dogs there too.

It is for our vivisectionist to say whether he will go to either of those climes and disturb the seats of the dogs at the risk of echinococcus, or stay at home and read.

The last letter we have had from Dr. Mastin is equally refreshing. The writer says: "You can't imagine the amount of comfort I now enjoy. You all opened up for me a new and delightful page in life's great book."





